ABSTRACT

Methods and apparatus are disclosed for dynamic allocation and management of semaphores for accessing shared resources. These resources may be part of a computer or communications system or a network, such as, but not limited to a disk drive, printer, memory, file, database, code, data, etc., that can be allotted to a task while it is running. In one implementation, a semaphore manager maintains a data structure of resources having currently active resource requests and a list of each task requesting access and the particular type of access requested. When an access request is received for the first time for a resource, an entry is added to the data structure and access is authorized. Additional requests to access the resource may be received while the resource is allocated. If a new request for read access is received and the resource is currently under read access, access is granted and an entry is added to the data structure. Otherwise, the resource is currently unavailable, and access is either immediately denied or queued for possible future allowance during a specified, predetermined or forever duration. In one implementation, the semaphore manager uses semaphore primitives provided by an underlying operating system and assigns each resource request a semaphore received from the operating system. These semaphore values are maintained in the data structure, and may be used by the semaphore manager for fulfilling or timing out queued access requests. In this manner, access requests are made by a task based on an identifier of the resource (and not an identifier of a semaphore), and semaphores are dynamically allocated at runtime and only for those resources which are actually used.